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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAM, CATHY FONG FONG	

ART UNIT	PAPER NUMBER
1775	

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06/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/816,132	BRIST ET AL.	
	Examiner	Art Unit	
	Cathy Lam	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 30-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18 & 30-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 20, 2007 has been entered.

2. in view of the amendment and remarks filed on March 20, 2007, the 112 rejections have been withdrawn. The pending claims however continued to be unpatentable as following:

Claim Rejections - 35 USC § 112

3. claim 41 is rejected under 35 USC 112 sixth paragraph, as it involves phrases "means for ..." are unclear as to what are these "means" referring to? See MPEP 2181.

4. Claim 42 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is structurally indefinite as to where Is the "solder mask layer" located with respect to the thermochromatic layer as well as the signal and carrier substrate.

Claim Rejections - 35 USC § 102

5. Claims 1, 2, 9, 30-34, 41 and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by Arnaud et al (US 6872453).

Arnaud discloses a thermochromatic coated layer comprised of a substrate having a conductive layer and a thermochromatic layer. Optionally, a glass or another layer used as a barrier may be included (col 6 L 54-56 & col 7 L 1-4).

The thermochromatic layer has an activation temperature from 30 to 40 °C (i.e. 86-104°F) (col 6 L 41-47).

The examiner takes the position that Arnaud's substrate and conductive layer resembles a printed circuit board since the conductive layer is connected to an electrical supply. The conductive layer heats up by resistance heating , it transmits the heat to the thermochromiatic layer in order to make it switch to its reflecting/absorbent or visual state (col 5 L 66- col 6 L 6, L 51-55). The thermochromictic layer has optical properties, is turned on by electrical control (or electrical supply) (col 6 L 36-40).

6. Claims 1-2 , 6, 9, 30-31, 34, 41 and 43 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Larson (US 6229514).

Larson discloses a display comprised of a substrate (10), electrode patterns (4,5) and a visualization medium (8); all in the named order.

The visualization medium (8) is temperature sensitive and changes color upon heating of the electrodes (col 5 L 10-17). The electrodes are connected to control units (e.g. integrated driving circuits) (col 4 L 49-53). The visualization medium transforms a spot heat to a visible dot (9), the examiner takes the position that this is analogous to the identification markings as stated in claim 9.

The examiner takes the position that the electrodes on the substrate resembles a printed circuit board and the visualization medium resembles the thermochromatic

coating. The thermochromic coating is opaque at room temperature but becomes transparent when heated (col 6 L25-29). The thermochromatic material can be a liquid crystal material (col 6 L 30-33).

7. Claims 1-3, 6, 9-13,17-18, 30-31, 38 and 41-43 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Parker (US 4922242).

Parker discloses a thermochromatic material coated substrate comprised of electrodes, a pigment layer, a transparent substrate, a mask and a thermochromatic material.

Electrodes (122,122') are formed onto both surfaces of the substrate (121) wherein the substrate is a resistive element (col 3 L 3-34). A mask (7) having a cutout pattern is placed adjacent to the first surface of the substrate (col 2 L 64-68). The thermochromatic material is applied to the second surface of the substrate (Fig. 2). Such that from Fig. 2, the thermochromatic material is placed below the mask (7).

The thermochromatic material can be a liquid crystal polymer (col 5 L 21-23). At the transition temperature, the thermochromatic material changes from opaque white to transparent (col 5 L 38-39).

The examiner takes the position that the electrodes on the resistive element is equivalent to a printed circuit board and the electrodes resemble the signal layer. Also, the examiner takes the position that the thermochromatic material is integrated with the mask layer (7).

Claim Rejections - 35 USC § 103

8. Claims 1-18 and 30-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker (US 4922242) or Arnaud et al (US 6872453) or Larson (US 6229514) in view of Rait (US 6880396).

Parker, Arnaud and Larson all teach an electronic device (or a printed circuit board) having a liquid crystal thermochromatic material coated over the device.

The prior art references however do not teach the solder mask is transparent as in claim 8, nor do they teach the particular arrangement as in claim 16. The prior art also do not teach the thermochromatic material can be a leucodye or an N-isopropylacrylamide compound.

Rait teaches a liquid level indicator which is used for monitoring the amount of liquid in a container.

The liquid level indicator is a leucodye ink which is a thermochromatic material that exhibits vivid color changes with slight changes in temperature. The leucodye ink is to replace the conventional liquid crystal thermochromatic material (col 4 L 51-67).

In view of the prior art teachings, one skill in the art would changes the arrangement to his desire and choose leucodye ink, liquid crystal or N-isopropylacrylamide as a thermochromatic material because the arrangement can be modify according to one's desire and these claimed thermochromatic materials are conventional heat sensitive color transforming.

Regarding to the activation temperature (i.e. claims 33), the examiner is taking the position that about 30°F (or < 0°C) to about 200°F (i.e. > 93°C) is such a wide range

that most electronic device operations would fall within. Especially, the two end points are temperatures that would require deliberate cooling and heating.

Regarding to the thermochromatic material that is to indicate an area of the carrier substrate that is above a normal operative temperature caused by a dissipation of heat from the heat generating component. The examiner takes the position that this is an obvious functional limitation because thermochromatic material is known as a temperature sensitive dye that changes colors when a certain temperature limit is reached.

Response to Arguments

9. Applicant's arguments filed on March 20, 2007 have been fully considered but they are not persuasive. Applicant in the remarks traverses the art rejections and raises the following issues:

A. Applicant argues that neither Arnaud, Larson nor Parker teaches "the thermochromatic material is selected to have its activation temperature above the normal operating temperature".

Arnaud discloses that the activation temperature is below at least some of the normal operating temperatures of the heat generating component.

Larson's activation termperature of the thermochromatic material is below the electrode's normal operating temperature.

Parker's display device having a thermochromatic material and a resistive element, which achieves a temperature above the activation temperature of the thermochromatic material .... Parker requires that the activation temperature be below

at least some of the normal operating temperatures in order for the display device to turn on and function.

B. Rait does not remedy the deficiencies of Parker, Arnaud and Larson.

In respond to the above issues:

A. All Arnaud, Larson and Parker teach an electronic device over which a thermochromatic material is coated.

Arnaud's thermochromic layer can be set (or adjust) depending on the operating temperature (col 1 L 29-43 & col 2 L 39-44).

Larson's thermoindicating layer (or thermochromatic layer) is temperature dependent, when temperature increases above a preselected temperature, the layer would change to transparent (col 6 L 25-29).

Parker's thermochromic material is also thermally responsive, depending on the amount of heat generated in the resistive element, the thermochromic material would change color (col 3 L 30-34).

The three prior art clearly teach their thermochromatic materials are thermally responsive and that the thermochromatic materials would have some visual affect when the conductive layer reached a certain temperature.

Since Applicant has not claimed any "normal operating temperature", it is unrealistic to argue the prior art of record do not include the claimed "normal operating temperature". However, the prior art of record clearly teaches the concept of the present invention.

10. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cathy Lam
Primary Examiner
Art Unit 1775

cfl
June 07, 2007